KSC TEST AND CHECKOUT SYSTEMS
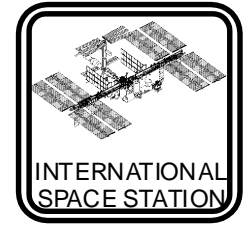
INTERNATIONAL
SPACE STATION

Payload Rack Checkout Unit (PRCU)

Robert Yaskovic / NASA-KSC / UB-C3
(Ph) 321- 867-5295 (Fax) 321-867-0775
Robert.Yaskovic-1@ksc.nasa.gov

KSC TEST AND CHECKOUT SYSTEMS

AGENDA

INTERNATIONAL SPACE STATION
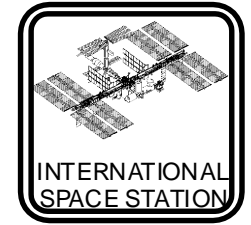
PRCU Program Role

PRCU Capabilities Overview

System Configuration

Physical Configuration

Subsystems

- Fluids/Structures
- Power
- Video
- C&DH

Block Diagram

KSC TEST AND CHECKOUT SYSTEMS

PRCU PROGRAM ROLE

Payload Rack Checkout Unit (PRCU)

– **Distributed verification of payload interfaces to the ISS Interface Control Documents (ICDs).**

– **KSC PRCU is used for**

   » **Re-verification of payload interfaces as required**

   » **Verification of ISPR/EXPRESS rack or attached payloads required by Payloads Office to undergo verification in PRCU prior to testing in PTCS**

   » **Offline Post-Delivery Check**
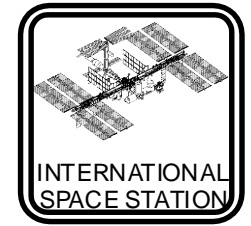
KSC TEST AND CHECKOUT SYSTEMS

PRCU CAPABILITIES OVERVIEW

INTERNATIONAL
SPACE STATION

PRCU PROVIDES:

– **Verification of payload to space station interfaces for U.S. Payloads (ISPR, EXPRESS, or Attached)**

– **Single payload – "multi-rack" checkout**

– **Subsystem interface testing**

» **Fluids/Structures**

» **Power**

» **Video**

» **Command and Data Handling (C&DH)**
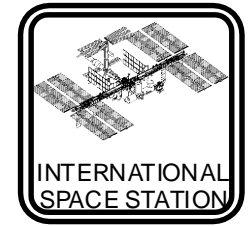
KSC TEST AND CHECKOUT SYSTEMS

SYSTEM CONFIGURATION

INTERNATIONAL
SPACE STATION

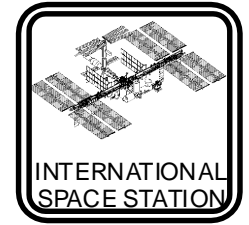**Insert PRCU Interface Overview from PRCU User Guide**

KSC TEST AND CHECKOUT SYSTEMS

PRCU PHYSICAL CONFIGURATION

INTERNATIONAL
SPACE STATION
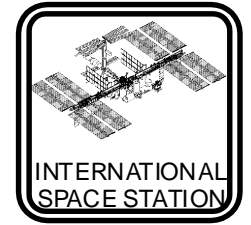
Insert KSC PRCU Facility Drawing

KSC TEST AND CHECKOUT SYSTEMS

SUBSYSTEMS

FLUIDS/STRUCTURES

– **System Capabilities:**

» **Includes GN$_2$**

» **Vacuum Exhaust & Resource**

» **Thermal Control System (TCS)**

- **Moderate Temperature Chiller**
- **Low Temperature Chiller**

» **Raised Access Floor, and Support Structure**

POWER SUBSYSTEM (EPS)

– **System Capabilities:**

» **Upcoming upgrade will allow local control via Programmable Electrical Power Supply Emulator (PEPSE) front panel and remote control via PRCU Sun workstation**
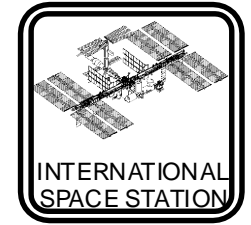
KSC TEST AND CHECKOUT SYSTEMS

SUBSYSTEMS

VIDEO

- **System Capabilities:**
    - » **Differential or Single-Ended**
    - » **CVIU for conversion of PFM to NTSC video**
    - » **Lightwave Multimeter to measure Optical Power**

COMMAND & DATA HANDLING (C&DH)

- **System Capabilities:**
    - » **LRDL, MRDL, and HRDL emulation**
    - » **Simulates C&C MDM**

KSC TEST AND CHECKOUT SYSTEMS

PRCU BLOCK DIAGRAM

Computational Rack

Data Acquisition Process Controller

Sun Workstation

C&C MDM Sim I/F

VME Backplane

• Buffers data and packages into FTP files
• Contains sensor interface for thermal, gas, vacuum, power, and C&DH

• User interface and PRCU control
• C&C MDM simulation
• Receives subset of payload data via FTP files, delogs and displays in binary or hexidecimal for manual verification

LR 1553

P/L MDM (FEU)

CCSDS

Capture / Sample

CCSDS LR

Ethernet Hubs

MR 802.3

802.3

Capture / Sample
PEHG Sim

CCSDS MR

CCSDS

CCSDS HR

Common Video I/F Unit (FEU)

Video PFM

Video Rack

• Contains test points for 802.3, 1553, high rate, video

• Video Generator
• Light Wave Meter
• VM 700
• Video Monitor

ISPR

NTSC

PEPSE

Control and Monitor

120 VDC Trielectron Power Supply

Control and Monitor

GN2

Control and Monitor

Supply

Low Temperature Loop

Return

Control and Monitor

Supply

Return

Mod. Temperature Loop

Control and Monitor

Control and Monitor

Return

Control and Monitor